attempt to place this work under a system of Government control and inspection would involve the exclusion of the important class of investigations which leads to the most novel and far-reaching results.

Our universities are straining their resources to the utmost in the effort to keep down expenditure. Where members of their staffs have gone on active service (in some departments to the extent of above fifty per cent.) their work is being cheerfully taken over by their colleagues. Not only are building operations being suspended (and this is probably a wise precaution for many reasons), but the purchase of books and apparatus is being reduced to the bare minimum.

The extra work undertaken by the remaining members of the staffs is only reduced in a very slight degree by the falling off in students. So long as a certain number of *classes* have to be held, a difference in the numbers of each class does not make a great difference in the work. The strain is bound to make itself felt sooner or later. But there are noticeable cases in which the effort to secure economy appears to have been carried too far. It cannot be desirable in the public interest that vacancies in two such important departments as physics and chemistry should remain unfilled, and we believe that it is in the interests of the Government, instead of bringing pressure on the universities to effect further economies, rather to exert its influence in checking them from going too far.

The four Vice-Chancellors of the northern universities are to be congratulated on the strong case they have made out. The matter is, however, one which affects all the modern institutions of university rank, and several of the statements in this article have been derived from independent sources. We hope that the action which is now being taken will prevent a mistake being made which must inevitably lead, sooner or later, to the realisation of the ideals of German militarism at the expense of Great Britain.

OLD-FASHIONED NATURAL HISTORY AND NEW-FASHIONED BOTANY.

(1) *The Hundred Best Animals.* By Lilian Gask. Pp. 304. (London: G. G. Harrap and Co., 1914.) Price 7*s.* 6*d.* net.

(2) *True Stories about Horses.* By Lilian Gask. Pp. 266. (London: G. G. Harrap and Co., n.d.) Price 3*s.* 6*d.* net.

(3) *The Human Side of Plants.* By Royal Dixon. Pp. xix+201. (London: Grant Richards, Ltd., 1915.) Price 7*s.* 6*d.* net.

(1) THE stories of a hundred animals of distinction are told to two children by a veteran who had been a mighty hunter in his day, and good stories they are. He talked mostly about mammals—lion and tiger, seal and walrus, elephant and ape, camel and llama, antelope and deer, sloth and ant-eater, kangaroo and duckbill. But, like Solomon, the veteran spake also, in the last five of the twenty-nine chapters, "of fowl, and of creeping things, and of fishes." We are not sure that Solomon would always have agreed with him; for instance, about the water reservoirs in the camel's stomach; or as to the advisability of telling children that wise folk think the tallest animal in the world has lengthened out its neck by so much reaching; or that "squirts out" is the right word to use in regard to the exudation of toad's poison. But there is no doubt that the book is one which children will thoroughly enjoy and also profit by.

The talks are natural, interesting, instructive, with fresh news to tell, and with no tiresome "writing down." Just now and again the old Nimrod nods a little; for instance, on the last page when he says, in a way quite unlike himself: "We come to understand the highest examples of the different animals—call them best if you will—by comparing them with others of the same species below them in the scale, whether of physical strength and beauty or intelligence." He was also nodding when he said that the heron "is very scare in England now." But these are trivial matters; the important fact is that this is a thoroughly sound and successful book to be cordially recommended. It is adorned and illumined by a hundred excellent illustrations—often strikingly alive—from original photographs by A. F. W. Vogt.

(2) The second book from the same pen is also intended for young readers. It contains many well-told true stories about horses. We are told of the doctor's horse that defended its sleeping master; of the horse that fought and defeated the wolves it had been left to satiate; of an Arabian horse that twice saved a soldier's life; of a number of mares, some past foaling, which combined for six hours to lift the foals above the level of a flood; of a Shetland pony that saved a child from drowning; of a horse that kept a long vigil over a dead soldier; of another that lifted a little child out of harm's way, and of many more besides. As will be seen from the examples cited, the stories are of a homely, old-fashioned type, and we

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are not surprised to find no reference to the "thinking horses" of Elberfeld. There are effective illustrations, and the printing of both books is such as suits both young and old eyes.

(3) Mr. Dixon has the courage of his anthropomorphism, which is of the deepest dye. For he maintains that plants "see, hear, taste, feel, walk, swim, run, fly, jump, skip, hop, roll, tumble, set traps, and catch fish; decorate themselves that they may attract attention; powder their faces; imitate birds, animals, serpents, stones; play hide and seek; blossom underground; protect their children, and send them forth into the world prepared to care for themselves—indeed, do all those things which we ourselves do. We now know that plants have even minds and souls, with which to think and to worship."

This is partly a rebound from a *hortus siccus* botany, partly an uncritical vitalism, and partly a somewhat saddening illustration of the lack of critical balance. Saddening, we call it, because the author has a fine series of most interesting facts to set forth concerning the intense vitality of plants, their movements, their sensitiveness, their adaptations, and their purposiveness (we do not say purposefulness), and yet he has gone and queered his pitch with an intolerably anthropomorphic and sentimental phrasing.

No one can be very enthusiastic over the botanist's terminology of chemotaxis, heliotropism, nyctinastic movements, and the like, but there should be some middle way between this and talking, as Mr. Dixon does, about the activities of plants as if they were on a plane with our own. We do not blame the author for regarding plants as psycho-physical beings—which seems to us a position which can offer a strong defence—nor even for speaking, if he wishes, about their senses (seven in number) and experiments, their "mentality and spirituality"; we blame him for leading the unwary to think that plants tackle the business of life on anything like human lines. For this will have to be unlearnt. Theirs is certainly *another way*, even farther from our understanding than instinct is.

TEXT-BOOKS OF PHYSICS.

(1) *Elements of Optics for the Use of Schools and Colleges*. By G. W. Parker. Pp. iv+122. (London: Longmans, Green and Co., 1915.) Price 2*s*. 6*d*.

(2) *Elementary Experimental Statics*. By I. B. Hart. Pp. vii+200. (London and Toronto: J. M. Dent and Sons, Ltd., 1915.) Price 2*s*. 6*d*.

(3) *Introduction to Heat*. By A. R. Laws and P. W. Todd. Pp. x+212. (London: Mills and Boon, Ltd., 1915.) Price 2*s*. 6*d*.

(4) *Experimental Harmonic Motion: a Manual for the Laboratory*. By Dr. F. G. C. Searle. Pp. x+92. (Cambridge: At the University Press, 1915.) Price 4*s*. 6*d*. net.

(1) IN Mr. Parker's "Elements of Optics" the subjects of reflection, refraction, mirrors and lenses, simple optical instruments, and dispersion are dealt with in four chapters. The book is intended for beginners, and no further mathematical knowledge is required for its perusal than an acquaintance with elementary geometry, simple algebraic equations, and the trigonometrical ratios. The text consists chiefly in the derivation of the usual formulæ of geometrical optics, the deviation method being employed for mirrors and lenses. The statements are accurate and concise, and the diagrams clear. Many teachers will regard the book as being too sparse and somewhat uninteresting owing to the absence of experimental matter. The inclusion of experiments to verify the laws and results by the aid of simple and inexpensive apparatus, would have enhanced the value of the book considerably. Numerical exercises are interspersed in the text, and answers are supplied.

(2) "Elementary Experimental Statics," by Mr. Ivor B. Hart, is written for pupils beginning the subject of mechanics. The mathematical knowledge assumed does not extend beyond an acquaintance with simple algebraic equations. The author deals with parallel forces, centres of gravity, inclined forces, friction, and the simple machines. The chief elementary facts are impressed on the pupil by a series of simple experiments. Full directions for the performance of these experiments are given, and the method of recording the results is indicated. It is better to insist on the tabulation of actual observations than results obtained after a mental calculation, as in col. 5 of the table on p. 45. The book is provided with a large number of questions and numerical exercises. The pupil who performs the experiments and works the examples in this book will have laid a good foundation for further study in experimental science.

(3) "Introduction to Heat," by Messrs. Laws and Todd, may be used both as a class and laboratory text-book in schools. The aim of the authors has been to introduce many phenomena from everyday life, and by appealing to the ordinary experiences of the pupil to awaken an intelligent interest in the subject. The order of treatment is somewhat different from that usually adopted in text-books of this character. The opening chapter

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